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The GESSEB glider mission for analysing mesoscale eddies in the southeastern Bay of Biscay

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The two-month GESEBB mission, carried out in summer 2013, was designed to sample a stationary Slope Water anticyclonic eDDY (SWODDY) that usually appears during winter in the southeastern Bay of Biscay. Previous studies based on in situ data and remote sensing images/data, didn't allow a vertical sampling, which could help to know the vertical structure of this mesoscale structure. For the GESEBB mission a Slocum-1000 type glider equipped with a CTD, dissolved oxygen, and fluorescence-turbidity sensors; as well as two drifters with a holey sock drogue centred at 50 m depth were deployed near the target oceanic structure. For monitoring the dynamic of the study area, satellite data from altimetry, as well as near-real time SST (AVHRR 1 km) and Chlorophyll-a concentration (MODIS 1 km) maps were processed. The flexibility of the glider for changing the mission plan, that is, for modifying the navigation and sensors related configuration, permitted to follow the eddy and to save the battery-energy, in order to successfully complete the planned mission.
The mixed layer depth during the campaign was centred at 30-50 m depth. At the surface the temperature and salinity ranged between 19.6ºC-24.4ºC and 33.9-35.6, respectively; the ranges decreased at 1000 m depth (9.5ºC -10.2ºC and 35.6-35.9). With regard to the fluorescence the maximum was centred at 50 m depth, that is, at the bottom of the mixed layer depth.
The glider not only crossed an anticyclonic eddy, but also two cyclonic structures. The water column notably changes below these structures, depending on the rotation of the gyres. The cores of cyclonic eddies are characterized by a depression of the isopycnals from the surface to 150-200 m depth and a doming between 200 m and at least 1000 m. The opposite behaviour is observed for the anticyclones, but the doming of the isopycnals occurs up to 100 m depth. Hence, the observed cyclones and anticyclones expand and contract the mixed layer. This vertical variability also affects the fluorescence and the concentration of the dissolved oxygen, whose maximums as well as quantity varies.

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